

REMARKS

Claims 1-48 are currently pending in the above-identified patent application. In the Office Action dated October 22, 2003, the Examiner objected to the subject Specification, as originally filed, because of the following informalities: On page 10, line 18, "or a or a substituent" should be changed to --or a substituent--; on page 15, line 14, ". . .the \end of a ..." should be reworded; and on page 28, line 25, Figure 14 is mentioned but cannot be located in the specification.

The Examiner then objected to claims 3 and 33 because in claim 3, line 3: "second electrode" should be changed to --counter electrode--; and in claim 33, line 1, "claim 8" should be changed to --claim 25--.

Applicants wish to thank the Examiner for carefully reviewing the subject Specification and Claims and identifying the aforementioned informalities and errors. Applicants have amended the Specification and Claims in accordance with the Examiner's suggestions. No new matter has been added by these changes.

Claims 1-3, 8-15, 18, 21-22, 25-27, 32-39, 42, 45-46 were next rejected under 35 U.S.C. 103(a) as being unpatentable over McEwen and Yair (U.S. Patent No. 5,965,054), and further in view of Kobayashi et al. (U.S. Patent No. 4,740,436), since the Examiner stated that McEwen and Yair discloses a method for inducing a response in a long-lived electrochemical device which comprises the steps of contacting a working electrode and a counter electrode with an ionic liquid having an anion and a cation; and applying a voltage between the working electrode and the counter electrode, whereby the response is induced in the long-lived electrochemical device. The Examiner continued by stating that McEwen and Yair does not disclose a conjugated polymer working electrode, but that Kobayashi et al. discloses a conjugated polymer positive electrode and a negative electrode composed of an alkali metal, an alkali metal alloy or an electroconductive polymer (a conjugated polymer). The Examiner concluded that it would have been obvious to one of ordinary skill in the art at the time the invention was made to have substituted the electrodes of McEwen and Yair for the electrodes of Kobayashi et al. because Kobayashi et al. disclose electrodes that would have provided a high energy density, good reversibility between charging and discharging, a very low self

discharging ratio thereby improving the overall performance of batteries.

Claims 6, 7, 30 and 31 were rejected under 35 U.S.C. 103(a) as being unpatentable over McEwen and Yair, and further in view of Kobayashi et al. as applied to claims 1 and 25 above, and further in view of Koch et al., since the Examiner stated that McEwen and Yair and Kobayashi et al. combination does not disclose that the anion comprises a weakly coordinating anion, but that Koch et al. discloses that the anion comprises such an anion. The Examiner then stated that it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the ionic liquid of the McEwen and Yair combination by incorporating the anions of Koch et al. because Koch et al. teaches anions that would have provided an ionic liquid with high thermochemical and electrochemical stability thereby improving the overall lifetime and performance of the device.

Claims 4, 5, 16, 17, 19, 20, 23, 24, 28, 29, 40, 41, 43, 44, 47 and 48 were objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Applicants respectfully disagree with the Examiner for the reasons to be set forth hereinbelow. Reexamination and reconsideration are requested.

Briefly, the present invention includes ionic liquids, mixtures containing ionic liquids, and solutions of ionic liquids and/or super-cooled ionic liquids in molecular (non-ionic) liquids, for the generation of electrochemical response in conjugated polymers for use as long-lived, stable electrochemical devices such as actuators, electrochemical capacitors, batteries, fuel cells, and electrochromic devices. Polyaniline electrochemical actuators and electrochromic devices and polyaniline and polythiophene electrochromic devices incorporating ionic liquids have been demonstrated as specific embodiments of the invention. The ionic liquids used for the demonstration of the present invention have a wide liquid range and offer the advantages of high thermochemical and electrochemical stability which are important for the fabrication of highly stable electrochemical devices.

Turning now to the rejection of claims 1-3, 8-15, 18, 21-22, 25-27, 32-39, 42, 45-46 under 35 U.S.C. 103(a) as being unpatentable over McEwen and Yair

(5,965,054), and further in view of Kobayashi et al. (4,740,436), applicants wish to point out that in Col. 7, lines 51-68, through Col. 8, lines 1-10 of Kobayashi et al., it is stated that "The supporting electrolyte of the electrolytic solution of the secondary battery of the present invention is an alkali metal salt. As the alkali metal of the alkali metal salt, there can be mentioned Li, Na and K, and Li is preferred. As typical instances of the anion component of the supporting electrolyte, there can be mentioned ClO_4^- , PF_6^- , These alkali metal salts may be used singly or in the form of mixture of two or more thereof. The concentration of the alkali metal salt depends on the kind of the polymer used for the positive electrode, the kind of the negative electrode, the charging conditions, the operating temperature, the kind of the supporting electrolyte and the kind of the organic solvent, and the concentration cannot be simply specified."

By contrast, Col. 4, lines 1-64, of McEwen and Yair states in part that "Specific characteristics of electrolytes of the invention containing 1-ethyl-3-methylimidazolium (EMI^+) as the cation, and hexafluorophosphate (PF_6^-) or tetrafluoroborate (BF_4^-) as the anion, in a number of alkyl carbonate solvents were compared to those of prior art electrolytes containing tetraethylammonium tetrafluoroborate (TEADF_4) in the same solvents," There is no mention in McEwen and Yair of the use of alkali metal salts which are required in accordance with the teachings of Kobayashi et al.

Since the invention of Kobayashi et al. would not operate using the nonaqueous electrolytes of McEwen and Yair, applicants respectfully believe that the Examiner has incorrectly combined the teachings of McEwen and Yair with those of Kobayashi et al. That is, there would be no motivation for one of ordinary skill in the art at the time the invention was made to combine the teachings of McEwen and Yair with those of Kobayashi et al. to render obvious the present claimed invention. A similar argument applies to the teachings of Koch et al. in that Koch et al. does not teach alkali metal salts.

For these reasons, applicants respectfully believe that the McEwen and Yair and Koch et al. references teach away from Kobayashi et al. reference and cannot properly be combined by the Examiner to render obvious the subject claimed

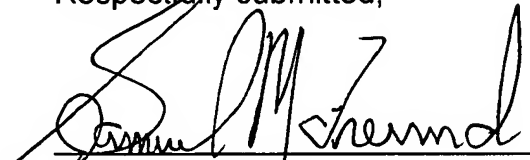
invention under 35 U.S.C. 103(a). The Examiner has therefore failed to make a *prima facie* case for an obviousness-type rejection.

Therefore, applicants believe that claims 1-48, as amended, are in condition for allowance, and such action by the Examiner at an early date is earnestly solicited. Reexamination and reconsideration are respectfully requested.

Date: January 22, 2004

Reg. No. 30,459
Phone (970) 377-6363

Respectfully submitted,



Signature of Attorney

Samuel M. Freund
The Law Offices of William W. Cochran, LLC
3555 Stanford Road, Suite 230
Fort Collins, Colorado 80525

IN THE
UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): Wen Lu, et al.

Examiner: PARSONS, Thomas H.

Serial No.: 10/027,251

Group Art Unit: 1745

Filing Date: December 21, 2001

Title: Long-Lived Conjugated Polymer Electrochemical Devices Incorporating Ionic Liquids

COMMISSIONER FOR PATENTS
Alexandria, VA 22313-1450



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TRANSMITTAL LETTER FOR RESPONSE/AMENDMENT

Sir:

Transmitted herewith is/are the following in the above-identified application:

- (X) Response/Amendment – Response to OA of 10-22-2003 "Amendment A" () Petition to extend time to respond
() New fee as calculated below () Supplemental Declaration
(X) No additional fee (Address enveloped to "Box Non-Fee Amendments")
() Other: _____

CLAIMS AS AMENDED BY SMALL ENTITY						
(1) FOR	(2) CLAIMS REMAINING AFTER AMENDMENT	(3) NUMBER EXTRA	(4) HIGHEST NUMBER PREVIOUSLY PAID FOR	(5) PRESENT EXTRA	(6) RATE	(7) ADDITIONAL FEES
TOTAL CLAIMS	48	MINUS	48	=	X \$9	\$0
INDEP. CLAIMS	2	MINUS	2	=	X \$43	\$0
[] FIRST PRESENTATION OF A MULTIPLE DEPENDENT CLAIM					+ \$145	\$
EXTENSION FEE	1ST MONTH \$55	2ND MONTH \$210	3RD MONTH \$475	4TH MONTH \$740	\$	
TOTAL FEE FOR THIS AMENDMENT					\$0	

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Respectfully submitted,

By:

Samuel M. Freund
Attorney/Agent for Applicant(s)
Reg. No.: 30,459
Telephone No.: (970) 377-6363

Date of Deposit: January 22, 2004

Date: January 22, 2004

Signature: _____

Typed Name: Zabrina Perry